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The process of film making can be thought of as beginning with a person's feeling or concern about something. To communicate this feeling to others, the film maker (sender) must develop an organic unit which will provide a vehicle that can embody the feeling/Story-Organism. The film maker selects and orders a series of signs, images, or events which translate the Story-Organism into a message. The film viewer (receiver) then reverses this process. In order to understand this process, a science of sign language (semiotic) must be developed with reference to films. A film may be thought as a series of videmes; a videme being defined as a generalized shot or take. The videme may then be examined from the standpoint of the five parameters of the structural elements of film language--Image in Motion over Time in Space with Sequence. To further develop the semiotic of film making various concepts and definitions of developmental linguistics ma y be useful. However, a methodology of research must be developed to explore them as they may apply to films. What is needed are specific hypotheses which can be tested, either by an analysis of film making or film viewing, or by controlled experiment. At the conclusion of the paper several ideas for research problems are set forth and a list of reference notes is given. (JY)

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THE DEVELOPMENT OF A SEMIOTIC OF FILM

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When writing about that mysterious scientific entity called a "sign," we may use the word "semiotic" with relative impunity; when writing about that magical phenomenon called "movies," we use words like "sign," "semiotic," "science," and even "analysis" at our own risk. We will have to learn to accept ridicule and even occasional vituperation from those of our fellows who look at films and write about them with and out of love -- of their own deep responses to the magic of film, and the art they believe film to be.

Signs may be analyzed, for few love them. But films are somehow delicate, like roses, and pulling the petals off a rose in order to study it is often viewed as an act of destruction. Or, conversely, others have taken the position that films, being tough, strong, and structurally indivisible, cannot be pulled apart for study. Such attempts, many feel, are doomed to failure, or worse, are merely fatuous.

And yet a great deal has been written about film in its almost seventy-five year history. It has been written about as art, as communication, as a new social phenomenon, and, in its newest form of production and distribution -- television -- as the herald of a new sensory civilization.

There has slowly accumulated a small body of analytical and theoretical work from Eisenstein and Pudovkin through Bazin, Metz, and Pasolini, and an almost equal body of attack at the futility of it all; this last attitude is perhaps best exemplified by some of the work of Pauline Kael.(1) In the process of formulating theories and criticizing them, conceptions from philosophy, psychology, anthropology, and recently, linguistics have been name-dropped, mentioned briefly, noted, and sometimes forced into juxtaposition with the word "film." Film has been made a part of our lives -- a dominant mode of human expression relatively little studied and understood at a time when the study of other, perhaps similar modes, such as verbal language, painting, and music have developed venerable bodies of theory and analytic methods. Those wishing to study film face a confusing and sometimes confounding choice of approaches. Shall one look at a film as art? If so, as what art? Is film like painting, theater, story-telling, or music? Shall one look at film as communication? This presupposes a definition of communication and commits one to a position that as yet has scarcely been adequately clarified, let alone accepted. Recently some attention has been given to the consideration of film as language. Shall it be studied as a subset of linguistics, using verbal language as a paradigm for the analysis of film?

At the present time the choice of a method or a body of theory to employ in the study of film is determined by the intuition and previous training of the investigator, by the fortuitous circumstance of place of publication, or by the particular public to be addressed. At this stage we have too much method and no theory which asks questions or sets problems for study. What is it we want to know about film more specifically than

"how does it work"? Until we can justify some set of questions as the parameters of our area of study a semiotic of film is impossible.

This paper rests on two basic and implicit assumptions which should be made clear at this time: (1) that film is amenable to scientific study and (2) that the organization and untangling of the large body of notions, statements, and theories which have been advanced about film and the study of film can be accomplished scientifically. Previous writers on film have attempted to describe, proscribe, predict, and evaluate what happens when a man makes a film and when another looks at it. These writers have proceeded in such a vast variety of ways, ranging from the esthetic, moral, literary critical, and psychoanalytic to the linguistic, anthropological, and experimental psychological, that a common language for research in film has yet to be developed. When I make the assumption that film is amenable to scientific study, I am assuming that a common language for talking about film is possible and that a common set of standards or criteria for the acceptability of evidence about statements as to the nature of film is possible.

Most of these problems can be subsumed under the heading of semiotics, which covers the broadest range of phenomena under which film might be examined. A semiotic "attempts to develop a language in which to talk about signs...whether or not they themselves constitute a language; whether they are signs in science or signs in art, technology, religion, or philosophy; whether they are healthy or pathic, adequate or inadequate for the purposes for which they are used."(2) In the development of a semiotic of film we will then have to develop a language to talk about film signs, which presupposes the development of a methodology for describing and determining

them. We will have to consider whether these signs constitute a language, with all that the word "language" implies. We will have to consider whether art, technology, science, or any other discipline offers insights into the structure of film and human responses to it, and whether these disciplines offer a methodology fruitful for research into film. We will be required to examine whether film can be studied the most fruitfully as a semiotic of communication, and will have to inquire into the purposes for which these signs may be used and are used, and whether they are adequate to specified purposes within specified contexts.

This paper will attempt to do four things: (1) To describe film as a process involving the filmmaker, the film itself, and the film viewer. This description will draw heavily on concepts of communication and esthetics. (2) To define film communication, accordingly, so that it relates this process to some of the current research in psychology, anthropology, esthetics, and linguistics. (3) To discuss the signs or units involved in film communication. (4) To broach the question of film as language and to attempt an integration of some relevant linguistic concepts with what we know about film. Here the relationship between theories of verbal language development and the development of film both as a historical process and as the development of individual skill in performance will be described. From the discussion of these four areas it is hoped that the beginnings of a language and a set of concepts and questions for the study of film will emerge. The consideration of these terms and problems, and a final section on method, are meant as a prolagomenon for the development of a semiotic of film.

THE PROCESS OF FILM COMMUNICATION

I do not intend in this paper to cite extensively or review all the directions of research previously alluded to. This article is organized on principles other than inclusion. The major criteria for including specific studies is that they may contribute in some way to the clarification, definition, or resolution of theoretical considerations raised by the attempt to develop a semiotic of film. In the area of specific film studies a small body of literature exists and several recent bibliographies have been compiled.(3) Research and theory drawn from other disciplines cover too wide an area in esthetics and the social sciences for a short review to be anything but superficial.

Research, analysis, and theoretical discussion of film can be seen as following three separate directions. One group, favoring an essentially evaluative esthetic direction, concerns itself with classifying films, film-makers, and viewers in a hierarchical dimension on a good-bad continuum. This group uses essentially the methods of art and literary criticism for either textual explication or esthetic judgment, placing films and film-makers into systems consistent with the older art forms such as theater, painting, writing, or music.

The second group concerns itself with the social-psychological effects of film on makers and viewers, either individually or collectively. Such studies include the well-known studies of the effects of violence in films, the effect of propaganda in films, and even more globally, the effect of this particular mode of expression on human beings in general.(4) Essentially, this group is attempting to predict the person or the society

from the artifact.

The third group concentrates on describing the medium, concerning itself (according to individual disciplinary ties) with "structure," "language," "technique," and "style."

In almost all cases previous research has dealt with a fragment of the total process without placing that part of the process within a framework or model of the whole. It would be as if one dealt with phonetics in verbal language without having a model of the speaking and hearing behavior of the speakers of a language.

In conceptualizing film from a semiotic standpoint it becomes quite clear that one of the basic suppositions employed by de Saussure, Morris, Sebeok, and others is the notion of a relationship between signs themselves and between signs and their users and context. A sign is not a phenomenon in and of itself; a "thing" becomes a sign only because it has a specific relationship to other "things."

Research that deals solely with the effects of a film on its environment, without relating this to the film-maker who made it, is ignoring a necessary relationship defining the film process; that is, the relationship between the sender, the message, and the receiver. Research that goes in the other direction, from film to maker, rather than from film to audience (the so-called psychoanalytic approach, for example, which tries to determine the man or the society from the artifact), falls into the same trap of dealing with a partial process without a model of the whole into which it fits. One can take either approach: given the artifact, try to predict the society, or given the society, try to predict the artifact. In either case, one cannot proceed fruitfully without a model of

the whole.

Similarly, those researchers working only with the film itself, its structure, style, or syntax, can do so fruitfully only within a total framework. Without this, verification of statements about structure and pattern become methodologically impossible. The problem of verification is indeed one of the major problems for a semiotic of film. One can, as Margaret Mead (5) has pointed out, start with an intuition about film structure -- indeed, one almost has to -- but one cannot build a scientific case for a semiotic of film by intuition alone.

Some method of verification of a hypothesized structure must be made explicit, and in order for this to occur, some model of the process and context by which a film-maker, a film, and a film viewer are related must be developed. Such a model at this formative stage in the development of research in film must correspond to what most makers and viewers intuitively feel happens. It must have face validity. It must further have enough heuristic value to indicate possible methods of verification for a semiotic, and must offer viable research avenues for answering the questions and solving the problems that the development of a semiotic of film inevitably poses.

This model should allow us to describe within one framework and with a common language the entire system within which filmic expression (I am deliberately avoiding the use of the word communication at this point) takes place, and also to place previous research within that framework for verification and analysis.

* * * * * *

The process of film communication can be thought of as beginning

with what I have called a Feeling-Concern. A person has a "feeling" the recognition of which under certain circumstances arouses enough "concern" so that he is motivated to communicate that feeling to others. I have purposely chosen the words "feeling" and "concern" because they are imprecise. After consideration of the entire model, it might prove valuable to try to fit the concepts that these words identify into tighter conceptual frameworks, but for the moment let us use the word "feeling" in the loose sense, by which we mean "I feel that...."

I use the word "concern" in the sense that Paul Tillich used it: "Each man has his own concern, the ultimate concern is left for man to determine."

This Feeling-Concern, then, this concern to communicate something, which many psychologists feel is almost a basic human drive, is most often vague, amorphous, and internalized. It cannot be transmitted to another or even to ourselves in this "feeling" state. With the decision to communicate, a sender must develop a Story-Organism, an organic unit whose basic function is to provide a vehicle that will carry or embody the Feeling-Concern.

The Story-Organism need not be a story in the usual sense of the word, but it may be. It is a set or cluster of "things" developed from the Feeling-Concern. I chose the word "organism" rather than such words as "element," "structure," "style," or "system" because I want first to suggest the living quality and nature of the process that Story-Organism names and to suggest the quality of growth and development as it occurs in a human personality in the act of communication. Second, the use of the word "organism" suggests the biological concept of function by which most

organisms are understood and by which we can examine the Story-Organism; and third, it is meant to call to mind the concept of organization. All these qualities, developmental, functional, and structural, are meant to be implied at the Story-Organism stage of the process.

The Story-Organism mediates between the Feeling-Concern and the next stage of the process of film communication, the Image-Event. Before describing the Image-Event, it might be helpful to look at the Feeling-Concern and the Story-Organism in another light. Suppose we think of the Feeling-Concern as a belief that we want to communicate. We can think of a belief in terms developed by Rokeach (6) as a "proposition we hold to be true which influences what we say or do. Any expectancy or implicit set is also a belief; therefore we can say that a belief is a predisposition to action." In this sense a Feeling-Concern is a belief about which we are predisposed to act. The Story-Organism can be thought of as the next step in that chain of actions. We do not always know, continues Rokeach, "what a person believes by any single statement or action. We have to infer what a person really believes from all the things he says and does. The organization of all verbal, explicit and implicit beliefs, sets or tendencies would be the total belief-disbelief system." In this sense what I call the Story-Organism can be thought of as similar to the belief-disbelief system developed by Rokeach.

The Feeling-Concern, then, is a feeling -- a vague, amorphous, internalized belief -- that a given person at a given time within a given context is concerned or predisposed to act on, in our case, to act on specifically by expressing or, undefined as yet, by communicating it. The Story-Organism is the organization into a system of those beliefs and feel-

ings that a person accepts as true and related to his Feeling-Concern. It is the structuring of the main constituent units, through which and within which his Feeling-Concern is clarified, organized, and brought to life so that it can be externalized and communicated.

It is at this point only, after awareness of the Feeling-Concern and development of the Story-Organism (either consciously or unconsciously), that a given person, a film-maker, can begin to collect the specific external Image-Events that, when stored on film and sequenced, will become the film. For the moment let us define an Image-Event as a unit of film.

So far we have talked only about the first half of the process. Sending has been started; a film has been made. I would like to suggest that the receiving process occurs in reverse order, as a mirror image of the sending process. The viewer first sees the Image-Events that we call a film. Most often he knows nothing of what went on before. He does not know the film-maker and his personality, and he usually does not know what the film is about, whether it is meant to communicate, or if it is, what it is meant to communicate.

Before being able to describe the manner in which the viewer interacts with the Image-Events on the screen, I must introduce some basic terminology for a semiotic of film. To this extent my description of the process forces me to assign more precise meanings to the vague terms I have used so far. A useful term for Image-Event might be "sign." By "sign" I mean the behaviorally oriented set of definitions developed by Morris and his followers. In general, and for introductory purposes, we may think of a sign as a part of a film that stands for something, that signifies. The signs in film that I will be discussing (either to show that

film is composed of them or not) are those that Morris designs as "comsigns" (communications signs): "A sign which has the same signification to the organism which produces it that it has to other organisms stimulated by it." The notion of communication signs contains the basic problem of a film semiotic, for it challenges us to determine whether in fact the process of sign manipulation which we call film is in fact communicative, and if so how this common signification between film-maker and viewer occurs.

When I use the term "film communication" I shall mean: the transmission of a signal, received primarily through visual receptors, coded as signs, which we treat as messages by inferring meaning or content from them. The film will be said to communicate to that extent to which the viewer infers what the maker implies.

If a film is a specific set of Image-Events that we call signals, which we organize into signs and messages and from which we infer content, we can ask several basic questions. What is there in us, or in the sign system, that tells us when to treat signals as messages -- further, that allows the transfer of common signification that makes for film communication. The definition I am proposing implies clearly that there is no meaning in a film itself. By common signification, or meaning as used in film, I mean the relationship between the implication of the maker and the inference of a viewer. Although the meaning of a film is inferred in large part from the images and sounds in sequence in a film, meaning is also clearly that which the film-maker implies, in his arrangement of the elements, units, and parts of the film.

It may be postulated as a first statement of film semiotic that film communication is the transfer of an inferable meaning through the range of materials that a film offers, or does not offer, as signs, and through the elements it allows or does not allow. These materials and elements impose their own restraints and constraints upon the signs and signals we receive and choose to treat as messages. It is these filmic materials, elements, and constraints, and their relationships to the meaning we infer from them, their relationship to themselves, and their relationship to the world of shared significance that we must study in order to develop a semiotic of film.

Let us return now to the model of the film process. We have hypothesized a process that starts with an internalized Feeling-Concern and develops into a more coherent and organized -- but sometimes, as in the case of a scriptless film, still internal -- Story-Organism, which then controls the choice and organization of the specific Image-Events that are always the external, available film. We have suggested that viewing the film is a mirror image of the making process, that is, that the decoder reverses the process by which the encoder made the film. Should our viewer choose to treat these signs and signals as a message, he will first infer the Story-Organism from the sequenced Image-Events. He will become aware of the belief system of the film-maker from the images he sees on the screen. From this awareness of the message he will, if the communication "works," be able to infer -- to evoke in himself -- the Feeling-Concern.

As you can see from this suggested view of the total process, the meaning of the film for the viewer is closely related to the Feeling-Concern of the film-maker. The Image-Events of the film are the signals; sequenced

Image-Events become coded into signs which we treat as messages; and our inference about the Feeling-Concern of the maker is what we call the meaning of the film.

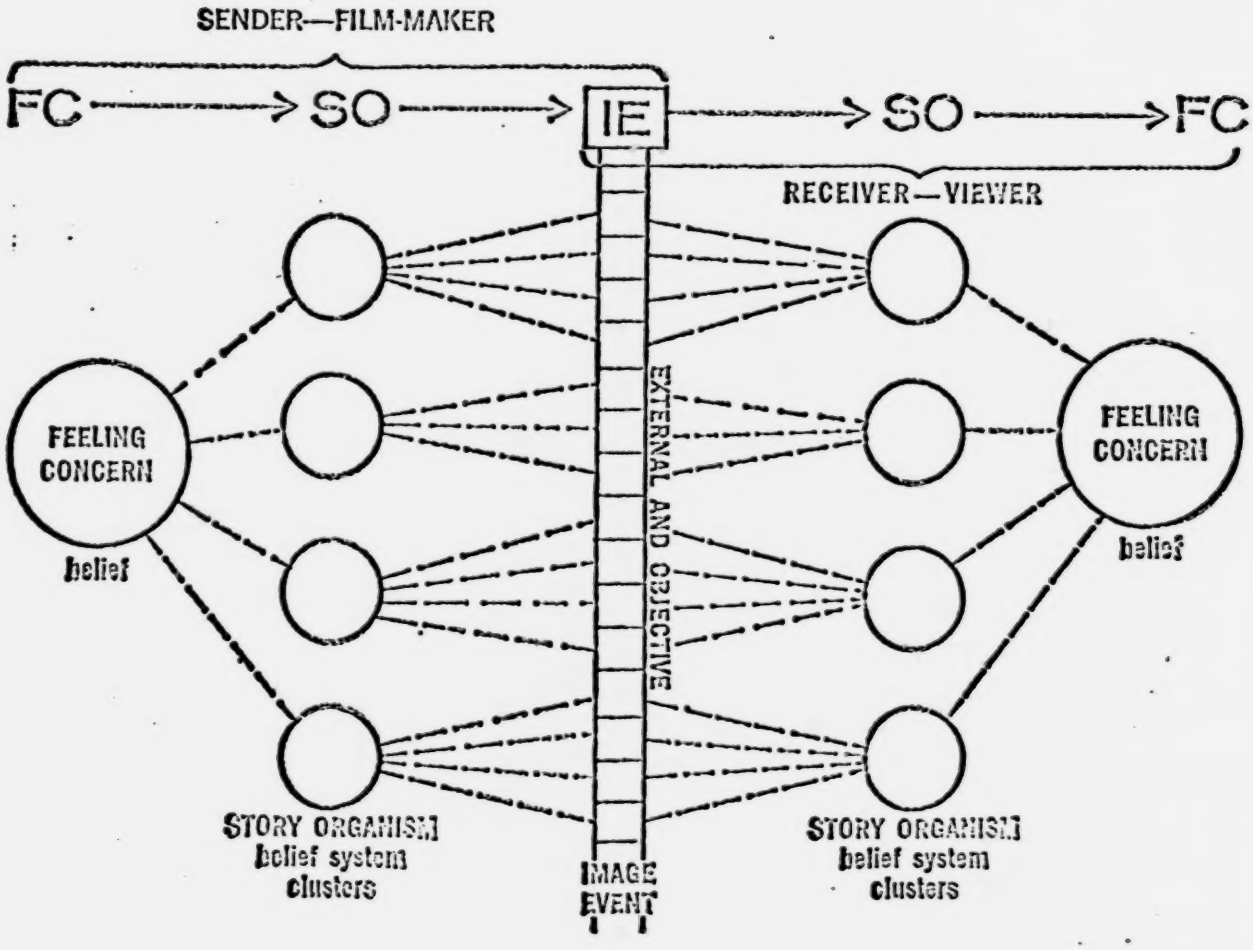
Ernst Kris (7), in Psychoanalytic Explorations in Art, takes a somewhat similar view of the process. Writing from a psychological-esthetic framework, he conceives of art "as a process of communication and re-creation." Communication, he continues, "lies not so much in the prior intent of the artist as in the consequent re-creation by the audience of his work of art. What is required for communication therefore is similarity between the audience process and that of the artist." He deals at great length with the psychic processes that occur when the process of creation is reversed within the viewer. Kris suggests that this process proceeds from perception of the work on a conscious level to the understanding of the work on a preconscious level to a re-creation of the original intent on an unconscious level, thus reversing the sequence that takes place within the artist.

The model that I have suggested describes the process of film communication which can be used as a base for a semiotic. It does not explain it. How is the common significance of signs achieved?

Let us examine in the diagram below the relationship between the sign system and the participants in its use. The first notion that emerges

FIGURE 1 ABOUT HERE

FIGURE 1


SENDER—FILM-MAKER
FC
SO
IE
SO
FC
RECEIVER—VIEWER
FEELING CONCERN
belief
EXTERNAL AND OBJECTIVE
FEELING CONCERN
belief
STORY ORGANISM belief system clusters
IMAGE EVENT
STORY ORGANISM belief system clusters

quite clearly is the difference between the Image-Event and both the Feeling-Concern and Story-Organism.

The three terms on the left of the drawing can be thought to belong to the realm of the film-maker. The three on the right belong to the realm of the viewer. The Image-Event is the nodal point of the process. It is common to both film-maker and viewer -- to both sender and receiver, creator and re-creator. The Image-Event is different from the other two terms in that it is part of the process both for the film-maker and for the viewer. It is also the only unit of this process that is directly observable.

The parts of the process that lead to the Image-Event and those that lead away from it to the inference of meaning on the part of the viewer are internal processes. The strip running down the page (like a strip of film) is our external, objective Image-Event. The series of concepts across the top of the model describing the process represent our internal world.

In our original definition of communication we implied that the inference of meaning from a film was a function -- a relationship -- of something in the message and something in us. We can look at this model and see that it suggests two separate fields of study, two kinds of questions. The first revolves around the explanation of the human beings involved in the process, and the second, around the explanation of the objective Image-Event that is the focus, the mediating agent, of the process. In order to explain the process of film communication we want to know what there is in the Image-Event that allows an individual to infer meaning from it. This particular area of study -- the interaction between persons and groups, and the stimuli they relate to -- has been undertaken by the social

and behavioral scientists. Although relevant to our interests, the specific study of the relationships between people and events cannot be the professional concern of those interested in visual communication.

The study of the Image-Event, however, its properties, units, elements, and system of organization and structure that enable us to infer meaning from a film, should be the subject of our inquiry and of our professional concern.

Let us assume that this process of communication works sometimes. That is, a human organism constructs a sequence of signs meant as an implication, and another organism looks, or looks and listens, to these signs and infers something from them. It is of course possible, as with speech, for a listener or a decoder or receiver to say, or even mutter inwardly, "I don't get it." Or he may "get it." A speaker may say,"Do you think it will rain today?," and a listener may reply, "My name is John Jones." We can frequently check this kind of verbal response by asking, "What did I just say?," and if the listener replies, "You asked me who I am," we know something is very wrong.

We have in the past learned a great deal about the specific interactions between the speaker and listener. For one thing both are usually capable of production and consumption of verbal messages. As a matter of fact we assume some form of psychic or biological pathology if this is not the case. We normally call listeners and speakers "sick" if they do not, as adults, know or respond appropriately to the common speech code of their community.

In the case of film such methodologies as inviting the listener to repeat utterances have up to now not been available to us. For one thing,

we don't "converse" in film. It is not a substitute for "talk" as is, for example, the sign language of the deaf and the mute. In film communication we are more in the position of listeners to a lecturer to whom we can never reply, than participants in a conversation. The situation is closer to the viewing of painting than it is to a conversation between speakers.

And yet sometimes we understand a film. Sometimes we are able to recognize the signals, code them into signs, reorganize them into their component units of Story-Organism, and infer a Feeling-Concern very similar to that implied by the maker. Figure 1 suggests a perfect correspondence

FIGURES 2A and 2B ABOUT HERE

FIGURE 2A

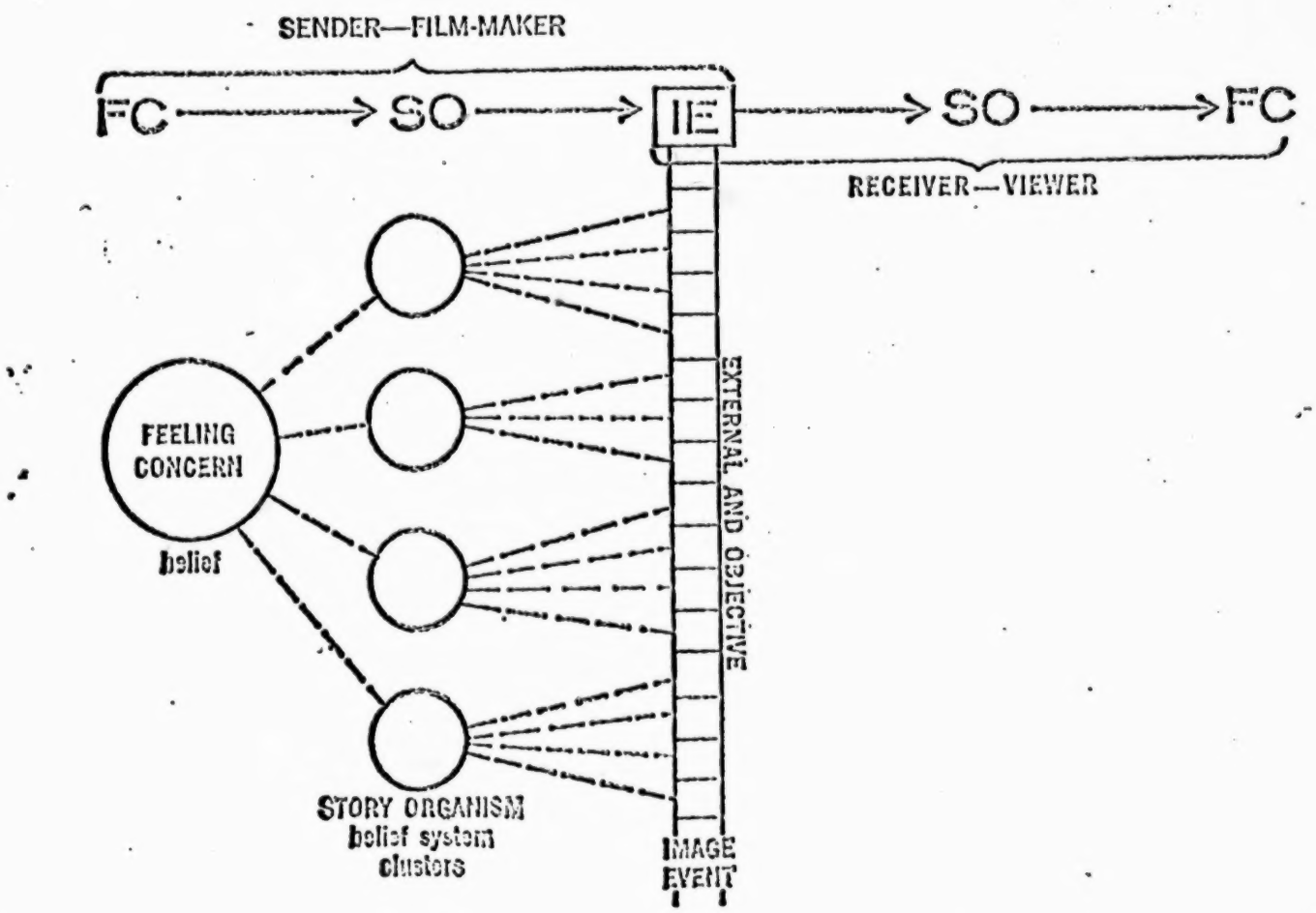
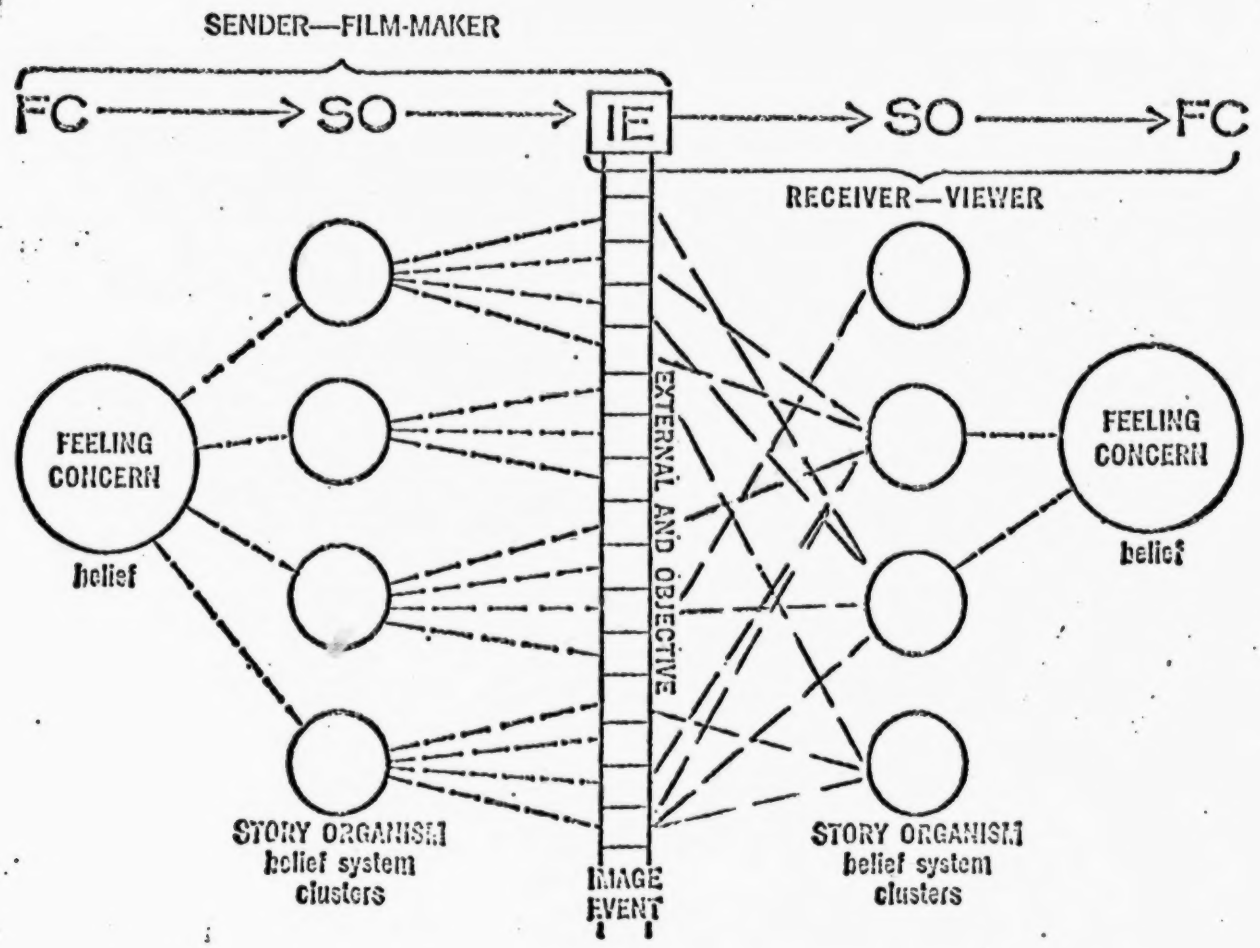

SENDER—FILM-MAKER
FC
SO
IE
SO
FC
RECEIVER—VIEWER
FEELING
CONCERN
belief
STORY ORGANISM
belief system
clusters
EXTERNAL AND OBJECTIVE
IMAGE
EVENT

FIGURE 2B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between encoder and decoder. Figure 2, A and B, suggests more probable results. Here the film-maker might be concerned with the problem of men and women living in a highly industrialized society. The film-maker (think of a movie such as Red Desert by Antonioni, for example) may be saying that the relationship between men and women in terms of the control of their relationships with themselves and one another can best be described in terms of the constructive and destructive effects of machines and industrialization on an environment and on a specific society. He may be relating the yellow gas released by a refinery which kills those birds that fly through it to the yellow hair of the man who accepts and uses a woman's inability to handle her emotional life.

A viewer may respond as in either Figure 2A or 2B. Let us start with the most difficult situation, but one which, because of film's newness as a mode of expression, is still possible. The viewer does not know what a film is. He sees images on a screen but does not know that he has to code them and make inferences from these images. He does not know that he is dealing with a sign system or even that he is seeing a "representation." He sees first a yellow flower on a background of fuzzy and unclear lawn, then a spurt of yellow gas from a smokestack, and then a blonde man walking down the street. The viewer might possibly walk away. He might intuitively think he was having a dream and expect the oracle to interpret it for him, or he might merely allow the bright colors and motion to be presented to him while he thinks of other things. He would respond similarly to Figure 2A. There would be no attempt on his part to code signs from signals, to treat them as messages or communication signs, so as to infer anything from them. The shared significance might be almost zero to the extent

that he does not even assume a set of iconic signs. Such a situation is testable, and one could determine whether this takes place with humans or not. The evidence at present is very unclear but seems to indicate that it is possible to find people who at first viewing a motion picture cannot even accept them as iconic representations. One would want to investigate this developmentally as well as culturally, finding out at what point, for example, a baby within specific cultural contexts makes such distinctions.

Let us consider Figure 2B. Here the viewer knows about films and has seen many of them. He assumes an implication on the part of the maker, and knows that he must infer meaning from the film. There may be a wide range of inference open to him. He may look for esthetic meaning only, or cognitive meaning only, or a combination of the two. He looks at the same film, sees the same images, and infers that it is about a crazy woman, a nice husband, and a mysterious stranger who loves her. He is quite clear about the fact that she is crazy because she leaves both men and that she tries to commit suicide, and concludes that the film is tragic in that a woman who has everything -- a nice home, a nice child, and a wonderful lover to boot -- wants to throw it all away.

Or another viewer may infer with equal certainty that the film shows quite clearly what happens when ungrateful workers go on strike. The nice manager of the plant is so busy running his factory, working day and night, that he has no time -- at the moment -- for his wife. This un-understanding woman falls into the clutches of a rich wastrel and deservedly has a miserable affair with him as a result of which her child gets sick and she tries to commit suicide.

Or again another inference can be made, but one which is tentative,

and the viewer will say, "I'm not sure what it was about. Maybe it was about...."

Still another possibility is that the viewer, quite convinced that he understands movies and the signs with which they are composed, may say halfway through the film, "The film-maker is crazy. This is a mess of random images from his subconscious. It has no meaning. I'm going home."

I have gone into specific examples of the responses to one film at such length because it is this sample of behavior that a semiotic must, in the last analysis, attempt to explain. It is also the kind of response to a potentially communicative situation (in which communication is impossible, broken, uncertain, or misinterpreted) which is the rule rather than the exception. Most film communication is not -- as pictured in Figure 1 -- the perfect correspondence between the Feeling-Concern, the Story-Organism, and the Image-Events they dictate, and their reconstruction by the viewer. Most film situations, depending as they must on the maker and his context (both social and psychological), the viewer and his, and the film itself, are imperfect communicative situations.

The only satisfactory end result of a semiotic of film would be the situation in which we could attempt to explain the failure (if that is the proper word) of complete communication that occurs in viewing a film. Such an understanding might make it possible for more perfect communication to take place, but this, it seems to me, is not the reason for wanting a semiotic of film. Such understanding is not designed to help us create better movies (on whatever level), although it might have such an effect; it is rather designed to help us understand the infinitely complex processes by which humans interact and transmit information in an always im-

perfect manner. It is designed to allow us to enjoy those very elements of ambiguity and imperfection by finding out where the uncertainties of human communicative interaction lie.

Understanding such a complex process is at present extremely difficult -- but that is where we must begin. There are several avenues from which we could start. We could examine in detail the relationship between the maker and the product he produces, between the sender-encoder and the signs he generates. Or conversely, we could examine the relationship between a set of signs generated by a known or unknown object and its effect on a receiver or decoder. Third, we could examine the sign system itself, determining methods of description and manipulation.

The empirical determination of relationships between signs and their senders or receivers is primarily a sociological-psychological problem at present and depends on an accurate description of the signs under consideration and the manipulations actually used as well as possible in that particular mode. Those involved in research dealing with the creation of film or with its consequences use film as a stimulus object mainly to develop and confirm theories about sociological and psychological principles. There does not exist for these researchers an adequate body of basic material about the sign system which is film itself from which they can draw.

Of course the questions of sign description can never be totally separated from their relationship to encoders and decoders, but at this beginning stage an effort must be made to concentrate on small areas, keeping in mind their application to the total model needed for verification.

It is for these reasons that I am proposing as the first task for a semiotic of film research into the sign system of film itself.

THE UNITS OF FILM

If we assume the general accuracy of the Feeling-Concern model developed above, a study of the sign system for film communication must begin with a notion of the development of a set, configuration, dimensions (8), or some grouping of individual units representing, or standing for, a previous set of thoughts, concepts, or, in Rokeach's terms, system of beliefs and disbeliefs. The Image-Events in a film are organized to convey or imply this system which they stand for, and the viewer in turn reorganizes them to infer it. All of this is done by reducing a complex set of internal mental processes into a set of external signs which are the units encoded and decoded.

The first question to be tackled, then, is the nature and description of what might be called the basic film sign. In the early days of movies, the basic film unit was thought of as the dramatic scene. This was essentially a theatrical concept; the first film-makers pointed the camera at some unit of action and event, and recorded it in its entirety. The limitations of the scenic unit were technological and dramatic: how much film the camera could hold, how much time the dramatic scene would take to unfold.

The earliest films were thus single scenes of what seemed to be a single unit of behavior. At that time few film-makers wondered about units of perception and cognition in moving images. It soon became apparent that these single behavior units could be glued together end to end to form a many-scened dramatic photoplay in the manner of live theater.

In 1902 Porter stumbled onto the fact that the scene was not the smallest unit of film. The scene itself was divisible. He found that iso-

lated "bits" of Image-Events could be photographed and glued together to make a scene. Most people making films at that time insisted that viewers could not "know" what was on the screen unless they saw the entire scene in an unbroken flow of event. It became apparent, however, that the film unit could be broken down from complete views of the actors and actions to "bits" of views of actors and their actions without any loss of comprehension. This meant a breakdown not only of the perceptual field of, let us say, a man, by showing us a sequence of a head and an eye or hands, but also a breakdown of the cognitive field by forcing us to put together separate ideas, or bits of ideas, across time. Just as we put together separate Image-Events in film in the way we do tachistoscope images, so also are we able to put together idea bits such as an image of a man followed by an image of a snake, which might under some conditions compel us to infer, "That man is a snake."

In 1923 Sergei Eisenstein (9,10) isolated a "basic" unit of film and called it the "shot." He made no attempt to define it systematically, but described it merely as the smallest unit of film that a film-maker uses. In constructing his theory of film, he formulated a concept, "the collision of ideas," which he called central to film, and set down for the first time what one can see now to be a special theory of cognitive interaction. Using an essentially Hegelian framework of thesis, antithesis, and synthesis, he proposed that a shot equals an "idea," and that from one idea colliding with another there emerges a third idea. It is interesting to note that the Russian word used by Eisenstein and translated into English as "collision" is the same word that Pavlov used, which was translated into English by psychologists as "conflict." If one reads the early literature on film and substitutes "collision" for "conflict," some interesting developments

in the psychological literature (11) become relevant to understanding film communication processes.

Arnheim (12), in 1933, working with the ideas of the early Gestalt psychologists, added some insights about perception and persistence of vision to the general body of film knowledge, but his major effort was devoted to proving that film is art rather than a mere recording of the world as it is. His basic argument was that film is art so long as it is "imperfect." Color and sound decrease its artistic properties because they are devices to make film "more perfect." Like Pudovkin (13), who in 1927 suggested undefined elements as "contrast," "similarity," "synchronism," "recurrence of theme," and "parallel structure," Arnheim attempted to formulate operational units which were elements. He tried to define such laws or rules as "constancy of viewpoint," "perspective," "apparent size," "arrangement of light and shade," "absence of color," "acceleration," "interpolation of still photographs," and "manipulation of focus." In all, he formed twenty such units and was forced to conclude that there could be hundreds more.

In 1960 Kracauer (14) also attempted to formulate some structural and rule-governed units, and although his units differed from Arnheim's, they took a similar shape. He listed numerous subunits merging into five distinct units: "the unstaged," "the fortuitous," "endlessness," "the indeterminate," and "flow of life." Slavko Vorkopitch, in a series of unpublished lectures on film held at the Museum of Modern Art in 1965, defined the film elements (although he did not call them elements) by saying that "film can be understood to be an art composed of kinesthetic, ineffable, and transcendental" units. He meant (I think) an art composed of moving,

transcending, and verbally inexpressible entities.

The aforementioned theoretical formulations about film contain several major flaws. The early writers were intent on proving that film was "art" or could be "art." Although they have helped us to recognize some of the parameters of film, their thought was concerned with descriptions of effects, such as Pudovkin's "contrast," "similarity," and "parallelism," and Kracauer's "the unstaged," "the indeterminate," etc., and was limited to discussion rather than scientific analysis.

The question of the basic sign remains complex and presumably can be solved in a variety of ways depending on how and <u>why</u> one wants to slice the film pie. Clear use of such units as "the scene" or "the indeterminate" or "the narrative" might be relevant to dramatic, philosophical, or literary criticism, but they are, for the moment, too broad to serve as basic in our sense. The unit of "the shot" that Eisenstein proposed seems at this point the most reasonable, not only because it is the way most filmmakers construct films, but because it is also possible to describe it fairly precisely and to manipulate it in a great variety of controlled ways. Not only do people in our culture and those who have learned our "system" of film-making use the shot as a basic construction unit, but recent research by Worth and Adair (15, 16) among peoples of other cultures who were taught only the technology of film-making without any rules for combining units seemed "intuitively" to discover the shot as the basic sign for the construction of their films.

Eisenstein, however, proposed a generalized unit called a shot, overlooking a distinction which must be made if we are to attempt further scientific analysis along the lines I have proposed. The shot is actually

a generic term for two kinds of shots: the "camera shot" and the "editing shot." I would like to propose a more jargonized terminology, whose usefulness will become apparent below. Let us call the generalized shot, which corresponds to what I have called previously the Image-Event, a videme. (17) It is the basic sign of film. The camera shot can be shortened to cademe and shall mean that unit of film which results from the continuous action of the movie camera resulting from the moment we press the start button of the camera to when we release it. The cademe can be one frame long or several miles long, depending on the will of the camera operator and the limitations of the technology involved. The editing shot, or edeme, is that part of the cademe which is actually used in the film.

A film-maker has an almost infinite choice of cademes which he can possibly collect for use in his film, out of which he usually chooses a smaller number for his film, and which he may shorten, rearrange, or manipulate, in a variety of ways. As a general analogy, which will be discussed further below, the edeme is to the cademe as the specific words chosen for a particular utterance are to the lexicon available to a particular speaker. No speaker has at his command at all times a complete lexicon, and no film-maker has for use in his film every possible cademe. A speaker chooses his word signs for a variety of reasons including both his rules of competence and performance, just as a film-maker chooses to make from his cademes that combination of edemes which according to his rules of film competence and performance he will call his film.

Just as the vocal musculature, brain, and cultural context set limits on the production of sounds and the manipulation we can make of them, so also do the technology of film and the psychology of perception and cognition

set limitations on the way we manipulate our film signs.

The single cademe can also be thought of (in an analogy to speech) as the storehouse of usable sounds available to any one speaker for any one Image-Event. The edeme then becomes those specific sounds a speaker finally isolates to form words and combines to form sentences, paragraphs, and larger units.

By making the distinctions between a cademe and an edeme, we call attention to some of the methodological problems surrounding research into the use of film signs. First, when we examine the development of film historically and individually in comparison with that of verbal language, we will find that the breakdown from larger to smaller units, as from cademe to edeme, is somewhat analogous to the processes postulated by recent work in developmental linguistics.(18) Second, the distinction between cademe and edeme allows us to observe more closely and to compare the processes by which units of film are broken down and organized by film-makers in different contexts. Not only, then, does the cademe-edeme distinction fit what we know about film, but it also offers us a fruitful approach to research in how different individuals, groups, or cultures organize image events.

Of course the shot -- cademe or edeme -- is only a hypothesized unit. It may well be the case that it is not the unit we use when we make inferences from film signs. It may be that the individual frame is a basic unit, or that sequences of edemes are the unit human beings really use. With a definite unit to start with, however, empirical research determining the psychological and physiological truth of our assumptions becomes possible.

Although the videme (the generic term for either cademe or edeme -- the Image-Event, as it were) can be postulated as a basic unit, it is clear that this unit is manipulated and acted upon on a variety of parameters and in a variety of ways. There are, for example, different ways of connecting videmes in a sequence. One can use the straight "cut," merely pasting the end of one videme to the beginning of the other; or one can use a "fade," in which one end is blended into blackness and fades into the image. Still another way is a "dissolve," in which the end of one edeme and the beginning of another are gradually merged into one another, making the separation of the two almost impossible to detect.

Apart from connectives the film-maker still has a great variety of alternative ways in which he can capture "reality" before his camera. A film-maker making a film deals with sign units as material objects which he combines, orders, and operates upon in such a way as to impel a viewer to relate them in specific ways if he chooses to infer meaning from them. (19)

There are five parameters which, when defined, can become a starting point from which to describe the structural elements of a film language. These parameters are an image in motion over time in space with sequence -- including as an overlay a matrix of sound, color, smell, taste, and other as yet unknown technological or sensory stimuli.

By the term "image" I mean that which I have called a videme. In a previous paper (17) I have described the parameters of time, space, and motion and how they can be used in research related to the inferences drawn from edemes manipulated along those parameters with specified connectives, such as a cut, a fade, or a dissolve.

The units that I have proposed are basic units and are by no means exhaustive of either the categories or levels of analysis that might prove

useful. They shall serve merely as a springboard to the problems that arise if we postulate any series of units in sequence. The parallel between "a sequence of signs conveying a shared significance" and notions of a "language" is too striking to overlook. The moment we reach the point where we can hypothesize that our signs are sequential and that this sequence makes a difference in implied and inferred meaning, we must consider the possibility that we are dealing with a language.

FILM EXAMINED AS IF IT WERE A LANGUAGE

Tremendous care must be taken in the development of a semiotic of film not to prejudge the question. The point, rather, is to use that most scientific of sign disciplines, linguistics, as a yardstick rather than a model.

In a conference on semiotics held in 1962 (20), Edward Stankiewicz made the following quite helpful comment in regard to proposals that the proper way to develop a semiotic of non- or para-linguistic modes was to deal with networks, total systems, and configurations of communication: "I could question the methodological merits of an approach that does not attempt to define the communication process in terms of its constitutive elements and which fails to provide criteria for their selection....I think it is important to study any communication process and its modalities with reference to language, since language is the most pervasive, versatile, and organizing instrument of communication."

What then are some of the problems that arise if we look at film as language, for this notion has occurred to film-makers before. Most

theoreticians from Eisenstein to Bazin have at one time or another used phrases such as "the language of film," "film grammar," and "the syntax of film." We often speak of "the language of dreams," "the language of vision," "the nonverbal languages," and so on. Most of us working in film or studying it seem to share a common compulsion to lend status to film by attaching it to "that most pervasive, versatile, and organizing instrument of communication." But, unfortunately, until relatively recently most of these uses of the term "language" were metaphoric and wish-fulfilling. Rarely has the term been used -- in relation to film -- in such a way as to provide us with an adequate descriptive theory enabling us to understand more fully the "faculté de langage cinématographique."

Bazin (21), Metz (22), and Pasolini (23) (a superb film-maker in his own right), and the members of the British Film Institute Seminars (24) have recently begun to look at films through the theoretical frameworks of de Saussure's semiology, Levi-Strauss's structuralism, and a variety of linguistic models. Most of these authors have contributed to a clarification of the problems I shall be dealing with below, but none of them seems to have tackled the problem of a film semiotic as a language from the point of view of a total communication system.

Definitions of language range from "Language is a purely human and non-instinctive method of communicating ideas, emotions, and desires by means of a system of voluntarily produced symbols" (25) to Hockett's fourteen design features (universals) of language. Some linguists specifically limit language to vocal signs; thus, "A language is a system of arbitrary vocal symbols through which members of a social group cooperate and interact" (26). Harris (27) defines a language as the talk which

takes place in a language community among a group of speakers each of whom speaks the language as a native and who may be considered an informant from the point of view of the linguist. He states, "None of these terms can be rigorously defined," and the word language itself in his opinion cannot be defined.

There is no point in an exhaustive list of definitions, or, in Wittgenstein's sense, in a list of descriptions of how people use the word language. It is clear from even a cursory glance at the literature on language and linguistics that these usages change according to the problems under consideration and according to the general sociology of knowledge in linguistics and related fields. In recent years one definition of language, advanced by Noam Chomsky of M.I.T., has been responsible for a great amount of research and seems to be the one single definition most commonly accepted: Language is "a set (finite or infinite) of sentences, each finite in length and constructed out of a finite set of elements. All natural languages in their spoken or written form are languages in this sense, since each natural language has a finite number of phonemes (or letters in its alphabet) and each sentence is representable as a finite sequence of these phonemes (or letters), though there are infinitely many sentences....The fundamental aim in the linguistic analysis of a language L is to separate the grammatical sequences which are the sentences of L from the ungrammatical sequences which are not sentences of L and to study the structure of the grammatical sequences. The grammar of L will thus be a device that generates all of the grammatical sequences of L and none of the ungrammatical ones. One way to test the adequacy of a grammar proposed for L is to determine whether or not the sequences that it gener-

ates are actually grammatical, i.e., acceptable to a native speaker, etc." (28)

This definition embodies very clear distinctions between the properties of a language and other forms of communication and discourse which would not be called language, and apart from the term "speaker" could possibly apply to nonverbal modes. It might be fruitful to see if some of his terms and concepts can be applied to the signs of film, the videmes.

According to Chomsky, (i) there must be a set of rules by which (ii) a native speaker constructs an utterance which (iii) can be grammatical or ungrammatical; and (iiii) there is such a thing as a native speaker. Therefore, by use of the rules (i), a linguist or a machine can construct utterances which the native speaker (ii) can make grammatical judgments about (iii). The linguist can also use the rules to judge the grammaticality of the native speaker's utterances.

Thus the system of common significances for a semiotic of film would have to include at the very least such shared units as rules, native speakers, and grammaticality. Although in Chomsky's above-quoted definition there is no mention of a lexicon, there is an implied axiomatic rule that there exists a lexicon for which the rules of usage exist, that is, that native speakers share a <u>finite</u> set of signs for which there is common agreement as to some shared significance.

Let us examine some of these concepts in relation to film. First, a lexicon. This is a necessary adjunct to verbal language. Since vocal signs are arbitrary and essentially "made up," there would be no way for a new member of a speech community to know these signs except to learn them, and therefore a lexicon or written dictionary becomes an indispen-

sable aid. Videmes, however, are essentially non-arbitrary and not "made up," but rather substitutions (29) for, or mechanical reproductions of something that exists in the real world. They are iconic as opposed to non-iconic, and while the number of words possible is infinite, the problem of developing shared significance as well as the degrees of usefulness of an infinite set of word signs limit the size of any speech community's lexicon. No such severe limitation exists in the development and use of iconic signs. If we think of a cademe as a basic unit, the film-maker clearly has an infinitely possible set at his disposal. Practically, it might be difficult for him to amass cademes taken in widely separated environments, or from difficult to reach environments, but even in a closed room the choice of cademes that could be used is incredibly enormous.

To a certain extent the shared significance of cademes is less accurate on some levels than the commonality of verbal signs, since the very arbitrariness of verbal signs make accurate definition necessary. On the other hand, the very basic nature of the generalized commonality of iconic representations makes the possibility of universal recognition that much easier. In terms of the developmental process by which humans communicate through signs (although cultural learning and a high degree of biological maturity are needed in order to learn to manipulate a specific set of arbitrary verbal signs comprising language L) representational signs are recognized and coded sooner biologically, hence more universally.

In a sense, the rejected notion of phonemic symbolism which was advanced as an explanation of the development of a verbal lexicon might very well, if transformed into a concept of iconic symbolism, be a valid

explanation of our ability to handle image communication with so much less training than it takes for us to manipulate signs in verbal communication.

* * * * *

In Foundations of a Theory of Signs Morris (2) proposed three aspects of semiotics: pragmatics, syntactics, and semantics. Pragmatics is "that portion of a semiotic which deals with the origin, uses, and effects of signs, within the total behavior of the interpreters of signs"; semantics deals with "the signification of signs, and to the interpretant behavior without which there is no significance"; and syntactics deals with "combinations of signs and the ways in which they are combined."

One might then say that the lexical quality of videmes is an aspect of both semantics and pragmatics, while the problems involving rules and grammaticality is the province of syntactics. I think these distinctions are less fruitful methodologically than theoretically. They serve to remind us of various aspects of signs but do not offer too much in the way of insight into methods of verification and description. It is at such points that linguistic methodologies might be examined. The method of "same" or "different," for example, in which informants are asked for their judgments about signs, could be applied to compare cademes and edemes, or edemes and edemes, with different operations of time, space, and motion applied to them. It would be interesting to see at what point any videme is declared by an informant to be different from another.

This of course deals only with an almost axiomatic aspect of language. Let us look at the further necessary, if not sufficient,

attributes of a language: rules and the conception of grammaticality.

Film-makers have over time developed what they might call "rules of film-making," or "rules of editing." Such rules as "Always follow a long shot with a close-up" or "Never cut more than 180 degrees" or "Always show an object moving continuously (don't jump cut)" are not what linguists mean by language rules, or what psychologists mean by rule-governed behavior. The previous examples of film rules are more proscriptions or prescriptions addressed to film-makers than statements about how encoders and decoders share common significances from sequences of videmes. To ascertain whether film has the kind of rule structure that linguists refer to we would have to ask questions of the following kind. If I perceive videme A, and then also perceive videme B, what happens to make me know A and B or even X? (I will refer to A and B in connection as AB but do not mean to imply multiplication thereby.) In looking at a sequence of different videmes, is there anything in the sequence and in the operations performed on the elements that allows or helps me infer meaning from them, regardless of the semantic content attached to each of the elements by itself? Sequencing videmes can be thought of as applying syntactic operations to edemes. This does not in itself imply a code, a set of rules, or a grammar -- but it does make it possible to test visual communication phenomena along these lines.

Sequence is a strategy employed by man to give meaning to the relationship of sets of information, and is different from series and pattern. As I will use the word here, sequence is a deliberately employed series used for the purpose of giving meaning rather than order to more than one Image-Event and having the property of conveying meaning through

the sequence itself as well as through the elements in the sequence.

A sequence of Image-Events is a deliberate ordering of edemes used to communicate the Feeling-Concern embodied in the Story-Organism. This concept of sequence as a deliberately arranged temporal continuity of Image-Events giving meaning rather than order is not meant to distinguish between dream and film, between conscious or unconscious motivation, but rather to exclude the kind of order that would result if a blind man put a set of edemes together or a seeing person put some edemes together without looking.

For example, we might find some interesting analogies by exploring some of the ways that sequence is dealt with in mathematics. Let us first consider the commutative law, which contains the statement that AB=BA. If we think of A and B as representing edemes and do not at this point consider signs such as "times" or "plus," we can ask whether the meaning that the viewer will infer from AB is commutative. That is, will a viewer infer the same meaning from the sequence AB that he would from the sequence BA?

If we also examine the associative law, which contains the statement that A+(B+C)=(A+B)+C, we are again able to find many parallel structures in film "language." Thinking of the letters A,B, and C as representing edemes and disregarding the plus, we can ask what properties of film language would apply to make a viewer infer connections such as A+(B+C) or (A+B)+C.

If the commutative law applies to film language, it cannot then be true that if two edemes in a sequence are reversed, the meaning of the sequence will change. Or we can ask another kind of question: Is there a way that we can construct a sequence of three edemes, A,B, and C, so that a viewer will put cognitive parentheses around two of them?

Are there cognitive signs in visual "language" that correspond to something like a parenthesis in written language? It is interesting to speculate as to the possibilities of there being signs in this language that make us infer connections such as plus, against, with, separated, and so on.

Such obvious manipulations as fades and dissolves suggest themselves immediately, and I plan to report at a later date on further studies attempting to describe these cognitive signs, signals, or rules, and to measure their dimensions of meaning in semantic and perhaps syntactic space.

To illustrate these questions in image terms, let us first think of a sequence composed of three edemes -- a baby, a mother, a father. Can these three edemes be sequenced in such a way that the viewer will infer cognitive parentheses around two of the edemes? Is there anything in film "language" that would make us think of (a baby and a mother) --(and a father)? Or (a baby) -- (and mother and father)?

In this almost oversimplified set of three edemes we have the nub of the rule problem as it relates to verbal language. A linguist can tell you fairly accurately why "Man bites dog" means something different from "Dog bites man." To be sure, the linguist is not quite clear why "John plays golf" is grammatical and easily understood, although "Golf plays John," while understandable and grammatical, is more difficult, and "John plays privilege" makes no sense at all.(30)

In film we are still not only uncertain about the relative difference in sign inference from edeme ABC to edemes CBA, but do not yet know how to measure these differences. Again, perhaps, methods from linguistics and the other social sciences will offer some methodological clues <u>if</u> we can pose clearly formulated problems.

The very notion "grammatical" does not exist for the interpretation of iconic signs. Man, as far as we know, is the only animal who assigns a truth value to a visual representation. We say "That's a man," or "That's a house," or "I don't know what that is." We do not, however, say that picture, edeme, or film is grammatical. At present such a distinction is not common to any large community of film viewers.

One reason for studying film as a system of semiotics is that it is so young historically, and that its rules are as yet relatively unformed. It may well be the case that it was so in the early development of verbal language. We may develop more clearly defined rules and a notion of grammar in film over time. If so, and if we can study this development, it might shed light on processes of human cognition responsible for linguistic coding behavior.

There is some evidence (18) that children learning a language do not start out with what might be called the rules of adult grammar. Early researchers (and some current workers) in language development assumed that children learn a new language by imitating the adult speech they hear around them in a kind of complex operant conditioning situation similar to that described by Morris, and that patterns of speech in infants up to twelve to fifteen months could not be found. Such patterns as were noted in early studies were dismissed as bad imitations or mistakes learned from adults. It seems quite clear now that when children learn to speak they may possibly follow a pattern based on some set of rules which, according to Brown, McNeil, (18) and others, seems to be a built-in, innate, biological function of the human brain. It has been shown that children learning to speak do not make the "mistakes" that the adults whose speech they hear the most make. Instead they make their own "mistakes," following a set of rules that seems similar for all children regardless of the

language they speak.

These researchers have found that in the beginning a child attempts to build up a lexicon by amassing a set of single words which he utters. This single word, or holophrastic utterance, is the functional equivalent of the adult grammar's sentence. A child may say "water." He might mean "That is water," "Give me a glass of water," "I have just had a drink of water," "Where is the ocean?," or "I want to go into the water to swim." This holophrastic sentence is meaningful to the extent that we know the context in which it was uttered.

The next stage in his development occurs when he learns to differentiate between words and to make progressively more complex categoric distinctions between them. First he divides his words into two classes, which have been called by Brown modifier and noun classes, and by McNeil pivot and open classes. The pivot-open description seems more applicable to film and so I shall use that. Here the child arbitrarily takes certain words from his learned lexicon and gives them special consideration. For example (31), out of a store of words consisting of "this," "that," "arm," "baby," "dolly's," "pretty," "yellow," "come," and "doed," the child will separate out "this" and "that," and make expressions such as "this arm," "that arm," "this yellow," "that come," and so forth. Or in another case he will choose "allgone" as his pivot word and try it out with all his open class words, getting sentences like "Allgone Mommy," "Allgone boy," "Allgone yellow," and so forth.

It is only after mastering this construction that he begins to successively differentiate what we call nouns, pronouns, modifiers, verb inflections, and so on. It is precisely because at a certain stage a child may say "I doed that" instead of "I did that" that we can infer

his instinctive desire to make rules for language. His "mistake" is really not an error, but the lack of knowledge about an exception to the rule that "ed" is a morpheme marking the past tense of a verb.

Let us try to compare this notion to what might be called the developmental pattern of film. The first "films" -- the shot of a kiss, of a train coming into the station, of a mother washing a baby -- can be considered examples of a holophrastic film. The kiss was an undifferentiated cademe. As Leopold (31) puts it, referring to speech, "The word has at first an ill-defined meaning and an ill-defined value. It refers to a nebulous complex, factually and emotionally; only gradually do its factual and emotional components become clearer, resulting in lexical and syntactic discriminations." McNeil comments on this that "a degree of semantic imprecision is therefore taken for granted."

Note here the similarity to the Feeling-Concern model I discussed earlier. It is almost as if in early film use the film-maker attempts to translate his feeling-concern directly into a single image-event -- a single cademe -- and that becomes a film. It has also been noted that these early holophrastic utterances seemed closely linked with action and carried a vaguely defined emotional overtone. The consensus among developmental linguists seems to be that holophrastic speech has three intertwined functions. It is linked and often fused with action, it expresses a child's motivational and emotional condition, and it usually names things. This similarity seems to hold up for the undifferentiated cademe. De Laguna's comment (31) about holophrastic words seems almost like the advice of an experienced film-maker to a novice: "A child's word [your first cademe] signifies loosely and vaguely the object together

with its interesting properties and the acts with which it is commonly associated in the life of the child [in your life]. Just because the terms of the child's [the novice film-maker's] language are in themselves so indefinite it is left to the particular setting and context [surrounding edemes in the sequence] to determine the meaning for each occasion."

As the film-maker making his one-cademe films grew more sophisticated in the use of his signs, and as the technology developed, he realized that he could combine edemes to make longer statements. At first this combinatory power was used only to present actions that could not be photographed in one cademe. Porter, for example, in 1902 made a revolutionary film using three cademes. First a cademe of a group of firemen sliding down the poles of a firehouse and jumping onto the firewagon; a cademe as the horses and firewagon dashed down the street; and finally, a cademe of the fire fighters arriving at the scene of a fire and putting it out.

The developmental process so far might be something like this: The film-maker has at his command one sign -- a cademe -- just as it comes out of the camera. He controls the subject matter to the extent that he points the camera, and controls the length by his decision to start or stop the camera (and by his ability to know how much film the camera has available for one exposure). At a later stage he realizes that he can join cademes by merely pressing the button and allowing his camera to run again, putting the subsequent image on the same roll of film. He does this until his film runs out. He shows this length of several cademes as it comes out of the camera, and that is his film. Perhaps this is what Porter did. It certainly seems to be the case with most amateur

film-makers and their Brownie movie cameras today.

A further stage comes with the realization that everything one shoots (all cademes, or one's entire lexicon) are not needed in a film. Some can be thrown away as being "no good" or "not needed." They might, in the case of beginners, be over-exposed, moved, out of focus, or "unpleasant." At this point the film-maker learns the use of the splicer. He can join two lengths of film, leaving out that which he does not choose to use.

The next step is that the cademe itself becomes divisible, and the edeme is developed. This might correspond to the establishment of a recognition of units, so the holophrastic utterance "allgone" becomes "all" and "gone," or it might be the beginning of the establishment of some simple pivot and open class of edemes.

The film-maker realizes that just as every cademe is not necessary, so all of every cademe is not necessary. He can use parts of cademes to tell his story. Until this point the film-maker has still not learned to change the original order of cademes. Like a child learning a language, he may be capable of only one thing at a time. He makes edemes out of cademes but still in the same order as they were shot.

One would expect the next step to be the development of some primitive "syntactic sense." I do not have any evidence to show that any of these next steps must follow each other in some order, but the general notion of sequence contains several distinct concepts. First, possibly, is the notion that cademes themselves can be placed in sequences other than the one in which they were shot; second, that several edemes from any single cademe may be used as modifiers for other edemes. The notion that

a cademe close-up of the feet of a man walking can be broken into two or more edemes and inserted before and after an edeme long shot of the same man walking might be the development of a simple syntactic structure signifying the modifier of the object "Man walking."

The next steps revolve around the dimensions along which cademes and edemes attain "meaning" -- their length, their time of occurrence, their spatial dimension (long shot, close-up, etc.), and their semantic content. This may be the place where the undifferentiated cademe acquires a "particular setting and context to determine the meaning for each occasion." Here, too, in terms of semantic usage, there may be a developmental sequence in which one first joins cademes according to some rules of occurrence, causal, representational, iconic, or associational.

Without going into detail about the history of film, it seems possible to explain the history in this developmental light.

The rapidity with which this hypothesized development occurs has been demonstrated in an experiment with Navajo Indians conducted by the author (15,16) and John Adair. Six young Navajo bilinguals (three men and three women), who had previously been differentially exposed to film, and one monolingual (Navajo only), less acculturated Navajo woman of about 55, who had, professedly, never seen a film, were taught to conceive, photograph, and edit 16 mm. silent film.

Analyzing precisely what rules the Navajos followed in this scheme, and how far along they could go in the developmental process, was precisely the purpose for which much of our data was gathered. That is, at what point did they break cademes into edemes? What edemes served as modifiers for other edemes? Which cademes were extensively used and

which were discarded? How complex a structure, and how predictable a structure, did each Navajo develop individually, and what rules did all of them seem to follow? Did they correspond to "our" rules, or were they different?

At this point it might be useful to describe some of the first one-minute films made by the Navajos, which were made after three days of instruction in the mechanics of the camera. Mike said that he wanted to make a movie of a piñon tree. He wanted to show "how it grow." He set about finding a piñon seedling, making a shot of it, then a little bigger one, and so on, until he had photographed a series of seven cademes connected in the camera, ending with a full-grown tree. I thought he was finished at that point, but he continued with a dead piñon tree that still had some growth on it, then a tree that had fallen to the ground, then some dead branches, then a piñon nut, and ended with a shot of the same piñon bush he started with.

When the film was returned from the laboratory and shown to the group, we detected some puzzled looks. The "film" consisted of 12 cademes, starting with a shot of the piñon seedling, continuing the sequence of cademes as described above, and ending with another shot of the same seedling he had used as his first cademe.

Although Mike and the others could not make clear the reasons for their surprise at the result of their first shooting experience, Mike later was able to articulate his difficulty. He had photographed a sequence of trees in a particular order, a cademe sequence. Its sequence and semantic content, he felt, should imply the meaning, "How a piñon tree grows." Instead, because all the images had the same spatial relation

to the size of the screen -- that is, he shot all the trees, both the small and the tall ones, as close-ups (filling the full frame) -- he failed to communicate the process of growth which can be shown when something small becomes big. Because all the images -- those that represented "in reality" big things and those that represented small things -- were made to appear the same size in relation to the size of the screen, their representative or iconic qualities of "bigness" and "littleness," which were the relevant semantic dimensions of the cademes, were lost. As Mike continued his filming, however, he was able to master the semantic elements of space to achieve a rather simple syntactic arrangement.

In another case, that of Johnny, we have evidence of the independent discovery of what might be called the modifier-object relationship.

Johnny said he wanted to make a "movie" about a horse. After getting permission from the owner of a horse that was tethered near the trading post, Johnny started shooting his "film" about a horse. First he proceeded to examine the horse through the various focal-length viewfinders on the camera. He remained in the same spatial relation to the horse but tried "seeing" the horse from the different "distances" that various focal length lenses allow. He finally told me that he was going to make pictures of "pieces of the horse," so you would get to know a Navajo horse when "you see my film."

He shot about 10 close-ups of the head, the eyes, the tail, the penis, the legs, and so on. Each shot took him perhaps two minutes of thought to determine. He worked quietly, asking few questions, setting exposure and distance with care. After about 20 minutes he started looking at me frequently, not by turning his head all the way, but with that quick

sideways movement of the pupil that the Navajo use. Then he said, "Mr. Worth, if I show pieces of this horse, and then tomorrow take a picture of a complete horse at the Squaw dance -- or lots of horses, can I paste them together and will people think that I'm showing pieces of all the horses?"

I managed to restrain myself and said merely, "What do you think?" Johnny thought a bit and said, "I'd have to think about it more, but I think this is so with movies." I asked, "What is so?," and Johnny replied, "When you paste pieces of a horse in between pictures of a whole horse, people will think it's part of the same horse."

I mention these incidents for several reasons. First, it is difficult to know how Johnny "learned" this rule. Second, no matter how he learned it, Johnny after two days "knew" that people infer that a close-up acts as a modifier of a long shot in certain circumstances, and Mike (as well as the other students) "intuitively" knew that the way the cademes of the piñon tree were sequenced did not communicate the concept of growth.

In a period of two months each of these Navajos, including a 55-year-old woman who spoke no English and said she had never seen a film, made films up to 20 minutes long, using a simple to complex structure of edemes in a planned sequence having no necessary relationship to the sequence in which they were shot. We have reported this material in another publication and have detailed many of the "rules" the Navajo used that to me were quite simply "wrong."

This brings me to the last of the concepts of language mentioned earlier in Chomsky's definition, one that seems to have been overlooked by most researchers trying to find similarities between film and verbal

language. That is the notion of a "native speaker" or of a "language community." It is only the native speaker, according to linguists, who can be our informants about the rules or grammar of a language, and it is only the native speaker against whom we can check our reconstruction of the rules of his language or of Language. Although the linguist and the native speaker may be one and the same person (and in the Chomskian school most often is), it still presupposes that the distinction between a shared body of arbitrary signs and a set of rules for their use known by all the members of a community is a demonstrable fact. Are there such distinctions for film? Who are the native speakers? If we move in this direction, we are drawn to ask, "Are there different languages of film?," when we have not yet been able to determine whether there is a language of film. We could of course for the moment avoid the most perplexing parts of the question by assuming one universal "language" of film dependent on the common ability of human beings to recognize and code iconic images. This might be fruitful, for we could then begin to study universals and differences in the implications and inferences related to film signs across a variety of cultures and verbal languages.

There are several concepts coming from linguistics and communication, which recent researchers seem to find useful in the analysis of film from a semiotic point of view, that bear directly on the question of a language community. The first and most frequently mentioned is the de Saussurian division of langue, langage, and parole. While it serves quite well to distinguish between what Chomsky calls deep structure or the theory of language, surface structure or the theory of language L, and performance, the division serves merely to raise the same questions we have discussed

above. It presupposes a body of rules not only for utterances of one community but also another set of rules for all utterances from which those of any community can be derived, or from which they can be transformed.

The langue-parole distinction is a tremendously perceptive one in regard to verbal language. In recent years, transformed into a competence-performance distinction, it has led to two very different methodologies and sets of problems for research. If one, like Chomsky and his followers, sets out to discover rules of competence, one must be concerned with what people <u>can</u> say rather than with what people <u>do</u> say, and <u>why</u> they <u>do</u> say it. In discussing competence rules in film, we can at present merely find prescriptive and proscriptive evaluative rules. We can find some viewers and some makers who will say certain things are "wrong" or "ungrammatical." Using this method, we would have to call each group a language community. These groups -- the underground film-makers, the Hollywood film-makers, the "new wave," the television documentarians, or the cinéma-vérité film-makers -- do in fact rarely use the words "ungrammatical" or "wrong." Rather, they will call other films dull, uninteresting, bad esthetically, old-fashioned, middle-class, square, and so on. Films up to now have rarely been judged on other than evaluative-moral-esthetic grounds. The classic test -- and one that does not hold up completely even for verbal language -- would be something like two film sequences corresponding to Chomsky's

(1) Colorless green ideas sleep furiously.

(2) Furiously sleep ideas green colorless.

Here we would have to find a film sequence that we could judge meaningless but correct, and meaningless but incorrect. I do not believe that such a distinction, a distinction of grammaticality and meaningfulness on a

yes-no, bipolar scale, is an appropriate judgment for film signs at the present time. It might not be the best scale for verbal language either, for that matter, but that is going too far afield for this paper. Without a definite lexicon, which film will never have except in special cases, the binary, digital distinctions we can make with words are not the ones we make with film. Rather, we make probability, analogical distinctions, which depend on personal as well as cultural contexts. The langue-parole, competence-performance distinction, at this stage of our knowledge, seems much too forced to apply to what happens when we encode or decode film signs.

The types of films mentioned above -- new wave, underground, Hollywood,and so on -- seem much closer to what we can call questions of style. We are talking more about the differences between the utterances of Henry James and Ernest Hemingway, or between Allen Ginsberg and Robert Lowell, than we are between any poem written in English and any poem written in French. To be sure, English imposes certain stylistic restraints, just as a shoulder-held camera imposes technical and conceptual constraints, but that is far from the kind of rules we are talking about for verbal language. There are, however, valid and ascertainable stylistic constraints which are tied to culture and context in general and which explain certain usages in much the same way that knowing about the use of a chisel for carving stone explains why the Roman letter "U" appeared as "V" in early stone-carved inscriptions.

The notion of a style without a commonly accepted (by a language community) grammar was advanced recently by Pasolini (23). who proposed that films in general have styles, but that each film develops its own

grammar as it goes along. This seems intuitively to be much more the case. We would then be calling the differences between a film made in the style of Eisenstein -- with many short edemes in sequence meant to be organized into sequences in "collision" -- compared to that of, let us say, Godard, who often refuses to break up a scene by cutting the action into bits -- a stylistic difference rather than a grammatical one. We would be calling the specific manipulation of edemes and the parameters across which it was manipulated, which would be consistent across the film, its own particular set of rules by which we could by textual analysis, as it were, verify our inferences. It may be that over time these particular "grammatical devices" would become so generalized within large groups that they might assume the roles and rule-governing status of grammar. At such a point a viewer would say, "Ah, yes, that film is in Hollywood language, but the director or editor is using the language ungrammatically." Something of this nature may indeed develop in limited areas, but I suspect that our judgments will be more along poetic lines than grammatical ones. We will recognize iambic pentameter but will allow the meter to be broken for effect, without calling that ungrammatical. This would be analogous to what we do when we read the line from Gerard Manley Hopkins "...the achieve of the thing." We know that it is a variant of the grammatical form "the achievement of the thing." We accept in our coding or inference procedure that it is ungrammatical, but is used to give emphasis or weight to a unit of utterance. We make a correct inference from the line even though it is ungrammatical, because in a sense the style of poetry clues us to a new set of inference rules. It might be the same situation as exists when Godard uses a jump cut for em-

phasis. We assume he does it deliberately, that he knows but disregards the proscription for a reason.

In this connection the categories devised by Barthes (32) of langage, style, and écriture (which I would rather translate as "encoding" than "writing") offer some insights that might be applied to film research. Barthes feels that both language and style are closed by history and culture. Language carries the history of the medium, and the lexicon within it, vertically over time. Style is just as bound, but horizontally, over specific cultures and individual times. The writer has some choice of style, less choice of language, and the greatest choice in encoding within a language and a style.

In a sense the "language" of film, the knowledge and recognition of the edemes in a film, is fairly universal among men. We perceive and code analogic images of the outside world fairly similarly. It is the rules of coding these images that may differ, and what rules we find may be universal rules for a coding system which covers a vast variety of styles.

It seems to me, then, that the development of a semiotic of film depends not on answering linguistic questions of grammar, but on a determination of the capabilities of human beings to make inferences from the edemes presented in certain specified ways. Should we discover rules for manipulating edemes that make inference impossible or highly improbable, we might reconsider the question of a deep structure of innate responses in the brain, governing our coding habits for film and being responsible for a grammar of film.

Let us take one simple but prevalent controversy among film theoreticians. Eisenstein proposed that inferences are made by taking the

edeme A, juxtaposing it with B, and having the audience infer C. It was a notion stemming from his familiarity with both the operant conditioning research of Pavlov and his reading of the early Russian formalist linguists. Although he made no attempt to verify his theories experimentally, he made his films according to them. Recently Bazin and his followers have attacked this notion of film style. A scene, or an action, they say should not be broken up into little pieces and rearranged in an arbitrary way; such a breakdown of human behavior is "unnatural" and is not the way human beings perceive. If this is to be a meaningful criticism, it must mean that a film-maker cannot imply a meaning to a larger group of people who will infer what he wants them to infer in this manner. "Unnatural" must mean un-understandable, or, at the very least, demonstrably less understandable than some other system. The rule for the use of film signs that Bazin must be suggesting is that, if an action is broken up into pieces, we will be less able to infer a meaning from it than if it is shown us as one continuous cademe.

Clearly this is verifiable. Intuitively it sounds like nonsense, more the edict of the president of the academy than a serious statement about how things are. But perhaps <u>some</u> breakdowns in action or behavior, or <u>some</u> juxtapositions, are less understandable than others. It certainly seems reasonable to expect that I could take several cademes and so break them down that an audience would not know what they were seeing. At what point would this occur? Here it may be possible to discover some rules.

Hochberg (33), in a series of recent experiments in perception, found that contrary to previous theory humans can make sense out of units, or broken-up "bits" of a whole of perception. He used a Penfield

impossible figure, as his stimulus. When seeing the entire figure subjects could make judgments that it was impossible. He then showed them single slides of the left corner, the central portion, and the right corner. Subjects were still able to make judgments about the figure, even though they saw them in what Bazin and others have called an "unnatural" way. When, however, the central slide was repeated several times, making the duration between viewing of the crucial corners longer and increasing the apparent length of the frame, subjects had greater difficulties in determining the impossibleness of the figure.

It would be important for understanding our coding capacities for film signs if such experiments, increasing the complexity of the edeme structure along the parameters of time, space, motion, and position, and sequence, were instituted by film researchers.

I am suggesting, then, that linguistics offers us some fruitful jumping-off places for the development of a semiotic of film, but not a ready-made body of applicable theory leading to viable research in film. If we accept Chomsky's definition of language we must be forced to conclude that film is not a language, does not have native speakers, and does not have units to which the same taxonomy of common significance can be applied as it can to verbal language. At this point our aim should not be to change the definition of language so as to include the possible rules of film, although this may well be a resultant of further research in film, but rather to develop a methodology and a body of theory that will enable us to say with some certainty just how it is, and with what rules, that we make implications using film signs with some hope of similar inferences.

I have attempted in this paper to present what seem to be some of the fundamental problems before researchers in film semiotic. First, I

proposed a basic description of the process of film communication, which is the phenomenon a semiotic must attempt to explain. Then I proposed a set of basic units, which seem to be the phenomena which film-makers use in constructing their visual utterances. Third, I mentioned some of the problems in using verbal language and linguistics as a paradigm for the study of film. None of these presentations was exhaustive of the complexity of the process, the categories of units involved, or the conceptual problems of dealing with film from a linguistic base. They were meant as a perhaps oversimplified program for future research rather than as a final word on the subject.

One major problem remains, which, while I have no reason to think it can be solved easily, must at least be mentioned. That is the problem of a methodology for research.

A METHODOLOGY FOR RESEARCH IN FILM

For whatever reasons, sociological and/or psychological, persons interested in film have come to it from the study of literature, the practice of the various verbal and visual arts, or the ranks of the philosophy of esthetics. On the other hand, those presently interested in the development of semiotics in general have come primarily from the social sciences -- psychology, anthropology, linguistics. This latter group is, to a greater or lesser degree, interested in verifiability, scientific exposition, and theoretical development that ties in with other scientific knowledge of man's behavior. It must be said that up until very recently the most interesting, perceptive, and exciting insights

into how the process of film works has come from the former group.

There are some linguists who claim that poetry is not a proper domain for study by linguists, that in a sense it is extra-linguistic, a set of judgments made about language rather than a linguistic property within itself. All the more reason, then, for semioticians to guard against too close a bond with linguistic theories that might lead to the position that film cannot be studied scientifically.

The semiotician of film at this stage of extremely limited knowledge of film signs must, it seems to me, start out by attempting to discover and to describe what it is we euphemistically or metaphorically call a film sign. What is it that human beings encode and decode in a film? The intuitions of past and present researchers and film-makers is incredibly valuable, but we must begin to systematize them and to test them. This testing can be done by observation and analysis of film-making and film-viewing behavior, or it can be done by controlled experiment. But what is needed is observations about specific hypotheses, problems, or statements.

I would in this concluding section like to present some problems that I think are ready to be worked on.

Are there specific communities that have a shared system of rules by which they imply or infer meaning from a specific set of edemes? Do Navajos, as Adair and I have suggested, have a set of rules that they apply to film which are different from that of urban dwellers in America? Can these "film language" communities be better described across national or linguistic parameters, or are they, as Basil Bernstein's evidence shows, better described across coding systems shared by socio-economic

classes or cultural groupings? Are we, in film, dealing with a problem of cognitive style rather than a problem of language? This kind of research calls for both observational and experimental procedures that, although not perfect by any means, are available in other social sciences One of the reasons people trained in the social sciences have not tackled film yet is because the problems have not been clarified.

Another large area of possible research is one in which we would attempt to produce film sequences varying systematically across described units and parameters and test to see if our manipulations of these hypothesized units result in predicted changes in the inference of viewers. If by adding, subtracting, or rearranging units, we can communicate or not communicate, arouse or not arouse, imply accurately or not, we would begin to have some confidence in the nature and description of our hypothesized film sign.

Another possible area of research using the methodology and experience of linguistics would be the determination of units by the "same or different" question. Here we want to know not what is instrumentally different, but what is psychologically different, what manipulations make a difference in inference, and to whom. It is clear with verbal language that we can tell the difference between "tomāto" and "tomahto," but on one coding level we judge the two words the same and infer that they refer to the same designatum, and on another, we find the two words different and judge perhaps the social class, regional designation, or education experience of the speaker. What levels of coding are used for what signs in films? Is it the case that sequence and image itself refer to designata while angle, lighting, and so on refer to emotive, social, or other differences?

Given a set of cademes, would all people put them together following a similar, or even random, set of rules, or is it the case that different semiotic communities exist and that different groups would (i) make different edemes out of the same cademes and (ii) organize them differently? Here we have an almost classical scientific experiment in the sense that the finding either way, of no difference or of specified difference, would be equally an addition to knowledge. The above-mentioned procedure might throw a great deal of light on much more general problems of human cognition and coding which are difficult to tackle with words because no two language communities can handle the same set of words with equal knowledge as to their lexical meaning. The use of iconic signs capable of production and perception by almost all peoples was not possible previously. The movie camera removes the problem of the hand-eye skill which was necessary for the artist for the simple production of a <u>desired</u> image. With the movie camera the cognitive and perceptual processes by which we deal with iconic signs become capable of study.

Again, this short list of possible research areas is neither complete nor specific. It is an indication of work to be done and a jumping-off place from which a semiotic of film might perhaps become viable. I use the phrase "jumping-off place" deliberately because it seems to me that what we must find at this time is a point from which a landing place is, if not safe, at least visible.

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